Delayed halitosis—a rare cause

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Summary

A 38-year-old tuberculous male Pakistani presented with halitosis and a cough especially marked when lying on his left side. Barium swallow demonstrated a fistula between oesophagus and left main bronchus. Anti-tuberculous therapy and repeated cauterization failed to close the fistula. Thoracotomy confirmed a congenital oesophago-bronchial fistula. Division and suture resulted in cure.

Introduction

Fistulae between the oesophagus and the air passages may be congenital, traumatic or inflammatory (rarely) or neoplastic (frequently). Congenital fistulae when associated with oesophageal atresia present as neonatal emergencies. In the absence of oesophageal atresia, these fistulae may present insidiously and do so in adult life; oesophago-bronchial fistulae are the rarest of these abnormal communications (John, Gopinath and McPhail, 1965) 30 cases having been recorded by 1972 (Hill, 1972).

Case report

A 38-year-old male Pakistani presented to a Chest Clinic in April 1979 with a tender swelling over the mid sternum, cough and sputum especially marked when lying on his left side, several small haemoptyses and occasional vomiting. His wife complained of his halitosis, most marked in the morning after an evening curry.

Biopsy of the sternal swelling revealed tuberculous granulations, and culture confirmed *Mycobacterium tuberculosis*. A 9-month course of rifampicin 150 mg, isoniazid 100 mg (Rimactazid) and ethambutol rapidly restored his well-being and healed his ulcer but because of persistent coughing a barium swallow was performed. This demonstrated an oesophago-bronchial fistula (Fig. 1).

The fistula was demonstrated at bronchoscopy and oesophagoscopy, and cauterized with sodium hydroxide on 3 occasions at monthly intervals commencing 2 months after initiating anti-tuberculous therapy. Thereafter his cough was somewhat improved.

He returned to Pakistan only to reappear one year later still complaining of cough after eating. Repeat barium swallow confirmed a persistent oesophago-bronchial fistula.

At thoracotomy in February 1981 the area between the oesophagus and left main bronchus was dissected out to reveal a smooth tubular connection 1 cm long $\times$ 5 mm wide running upwards from the oesophagus to the left main bronchus. No significant adhesions or gross adenopathy were noted in the mediastinum and the left lower lobe looked and felt normal. The fistula was divided to confirm mucosa-lined lumen. The ends were then oversewn and buried. The patient now swallows without coughing and has no halitosis. A left bronchogram shows a normal left lower lobe.

Discussion

The tracheo-bronchial tree appears in the 3 mm embryo as a small bud on the ventral aspect of the foregut. This bud then sub-divides into the stem bronchi; further multiple sub-divisions produce the remaining respiratory tract. Congenital oesophago-bronchial fistulae may arise when a foregut diverticulum captures the terminal bud of a developing bronchus (Das, Dodge and Fawcett, 1959).

Almost every reported oesophago-bronchial fistula has occurred into a lower segmental bronchus. Only one other fistula into the left main bronchus has been recorded (Mullard, 1954).

Four types of congenital oesophago-bronchial fistulae have been classified (Bainbridge and Keith, 1965): a wide necked diverticulum with an inflammatory fistula at the tip (type I); a short track from oesophagus to lobar or segmental bronchus (type II); a fistulous track from oesophagus to lung cyst and thence to a bronchus (type III); and very rarely from oesophagus to a sequestered segment (type IV). The absence of inflammatory changes around the fistula making for an easy operative dissection confirms the congenital nature of the lesion and has been noted by all previous authors.

The mucosa of the fistula is commonly squamous

FIG. 1. Barium swallow showing fistula between the mid-thoracic oesophagus and the left main bronchus.

sometimes columnar, occasionally squamo-columnar and rarely transitional cell type. Muscularis mucosae and smooth muscle are always present (Le Roux and Williams, 1968).

Symptoms may be intermittent and commonly begin in adult life. Choking on swallowing is pathognomonic but often mild, cough is very common and often positional, haemoptysis is not uncommon and pulmonary infection is frequent. Halitosis has only been recorded in one other patient who came from the Middle East and also indulged in spicy foods (Hill, 1972).

The late development of symptoms has been variously attributed to a membrane occluding the fistula in the newborn and later breaking down (Jackson and Coates, 1929), a fold of oesophageal mucosa overhanging the orifice in early life (Mullard, 1954) but becoming less effective when the infected lung becomes fixed to the chest wall and mediastinal pleura, thus preventing free descent of the oesophagus on swallowing (John *et al.*, 1965), or the

upward course of the fistulous track from oesophagus to bronchus. The absence of pulmonary infection in the present patient as demonstrated at operation and by bronchogram was probably due to the acute upward course of a very narrow fistula from oesophagus to bronchus. Lack of adhesions would allow free oesophageal movement and further occlude the oesophageal end of the fistula.

The diagnosis is most easily made by a thin barium swallow given with the patient in the position in which he finds his symptoms most marked (Mullard, 1954). Bronchograms are required to assess pulmonary damage but rarely demonstrate the fistula. Bronchoscopy demonstrates the fistula more easily than oesophagoscopy but in 33% of patients the diagnosis is made at operation for pulmonary sepsis (Bainbridge and Keith, 1965).

Thinking that the patient's fistula might have been due to the breakdown of tuberculous hilar nodes, the authors anticipated improvement with anti-tuberculous therapy but hoped to accelerate closure

by cauterizing the fistula with sodium hydroxide. McCluskie (1976) reported complete closure in 6 of 9 late oesophago-bronchial and oesophago-pleural fistulae secondary to instrumental rupture or surgery, by such methods. Although the present patient noted some symptomatic improvement after cauterization, a later barium swallow demonstrated a persistent fistula. Persistence of fistulation suggested a congenital aetiology and indicated surgical closure.

Management is by surgical closure of the fistula alone or with associated pulmonary resection if indicated. No operative mortality has been noted in the reported series.

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